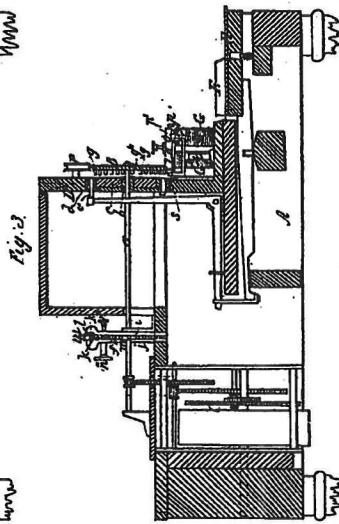
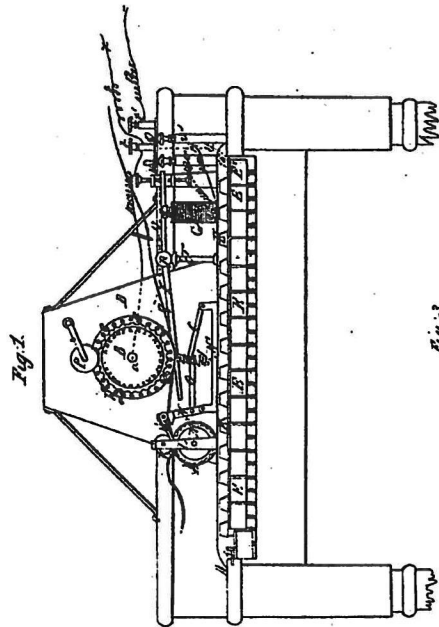
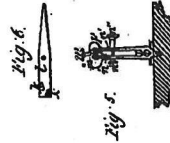
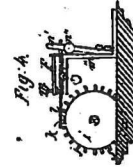
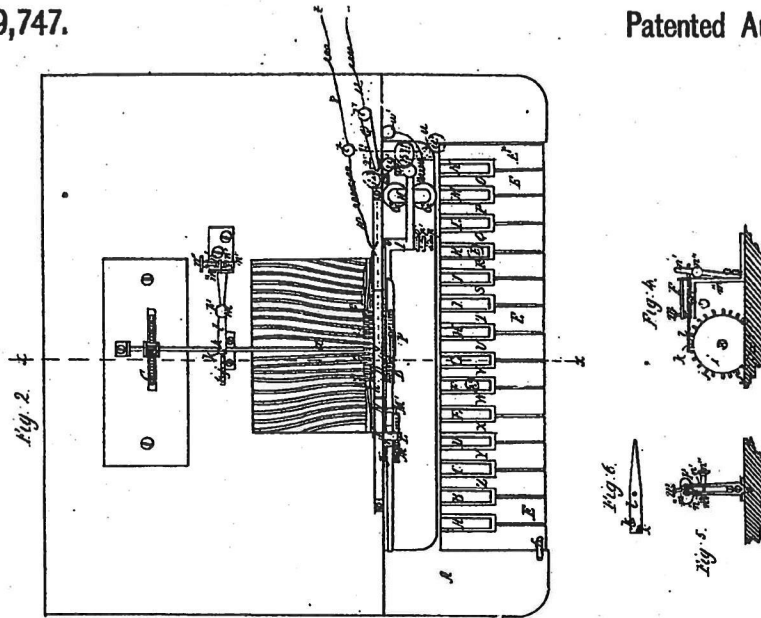


E. F. REYNOLDS.
Electro Magnetic Telegraph.

No. 29,747.

Patented Aug. 21, 1860.



Witnesses:
J. W. Corbin

Inventor:
E. F. Reynolds

UNITED STATES PATENT OFFICE.

EDWIN F. REYNOLDS, OF WEST FARMS, NEW YORK, ASSIGNOR TO HIMSELF AND G. E. SHERWOOD, OF MORRISANIA, NEW YORK.

IMPROVED TELEGRAPHIC INSTRUMENT.

Specification forming part of Letters Patent No. 29,747, dated August 21, 1860.

To all whom it may concern:

Be it known that I, EDWIN F. REYNOLDS, of West Farms, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Electro-Magnetic Printing-Telegraphs; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a front elevation of my invention. Fig. 2 is a plan or top view of the same. Fig. 3 is a longitudinal vertical section of the same, the line *xx*, Fig. 2, indicating the plane of section. Figs. 4, 5, and 6 are detached views of the mechanism for regulating the speed of the type-wheel.

Similar letters of reference in the several figures indicate corresponding parts.

This invention consists, first, in the employment of one and the same continually-revolving type-wheel for the purpose of receiving and transmitting messages; second, in the arrangement of a series of cogs on the under side of the type-wheel, in combination with a corresponding series of movable stops operated by keys, and with one stop on the lever that carries the armature, that the motion of the type-wheel is arrested either by depressing one of the keys or by passing a current through the electro-magnet; third, in arranging a stationary ring forming the guide for a series of stops that are operated by the keys in combination with one stop on the under side of the rotary type-wheel, so that by depressing the keys the type-wheel is made to stop at the letters corresponding to the keys which are depressed in rapid succession, allowing the wheel to move from one letter to the other without interruption; fourth, in a peculiarly-constructed escapement, which will be hereinafter more fully explained, in combination with the rotary type-wheel, for the purpose of regulating the motion of the latter and bringing the motions of the type-wheels in different stations in perfect accordance.

To enable those skilled in the art to fully understand, make, and use my invention, I will proceed to describe its construction and operation with reference to the drawings.

A represents a table that supports the entire mechanism of my telegraphic instrument. The type-wheel B rotates on an arbor, *a*, to which a rotary motion is imparted by a clock-work, C, underneath the table. The arbor *a* passes through a standard, D, having its bearing in a bushing, *b*, which is surrounded by an insulating-disk, *c*, and this disk is fitted nicely into a ring, *d*, which is firmly inserted into the standard D. The ring *d* is perforated with twenty-eight holes to correspond to the twenty-six letters of the alphabet, and a dot, and one to form a stop for the type-wheel when the instrument is not used, and each of these holes forms the guide for a pin, *e*, which connects by suitable levers with one of the keys E. These keys are arranged in front of the table in the usual manner, each key being marked with one of the letters of the alphabet and one with a dot. The first key on the left-hand side of the table corresponds to the key generally marked with a stroke, and a button, *f*, on the side of the key-board, serves to keep this key depressed, thereby preventing a motion of the type-wheel if the instrument is not used.

It will be noticed that there are twenty-nine keys, and each of the keys, with the exception of one, connects with one of the pins *e* that slides in the ring *d*. The remaining key E*—the last one on the right-hand side of the table—serves to close the general circuit, if the instrument is not used. The type-wheel B is furnished on its periphery with twenty-seven projections, arranged at equal distances one from the other, and engraved to represent the twenty-six letters of the alphabet, and one to represent a dot. Between the dot and the first letter there is an open space, which is situated at the under side of the wheel if the latter is stopped by depressing the first key on the left-hand side of the table.

On the back side of the type-wheel, and near to its circumference, are the pins or cogs *g* *g**, each pin to correspond to one of the characters on the face of the wheel. These cogs reach close up to the front side of the ring *d*, and the diameter of the circle on which they are arranged is sufficiently smaller than the diameter of that circle on which the pins *e* in the ring are placed that the same in revolving

with the type-wheel do not strike any of the pins *e* when the latter, by depressing the keys, are made to protrude beyond the surface of the ring *d*. One of the cogs, *g**, is furnished with a hook, *h*, extending in a radial direction, so that the same reaches beyond the circle of the pins *e*; and if one of the latter is forced out by depressing one of the keys said hook, by striking against the protruding pin, stops the type-wheel.

The motion imparted to the type-wheel by the clock-work *O* is regulated by a governor, *F*, a detached front elevation of which is represented in Fig. 4. It consists of a wheel, *i*, with rounded cogs *j*, which pass through between two flaring teeth, *k*, on the under side of a vibrating lever, *l*. This lever is fulcrated on a pivot, *m*, which screws into the end of an arm, *m'*, projecting from a standard, *m''*, and its tail end moves in a slot, *n*, in the top of said standard. The teeth *k* are placed in such a position that if no vibrating motion is allowed to the lever *l* the cogs *j* of the wheel *i* cannot pass through between said teeth; but if the tail end of said lever is allowed to move freely over the entire length of the slot *n* the teeth *k* have little or no influence on checking the motion of the wheel *i*. In order to regulate the speed of the wheel *i*, therefore, nothing is required but to regulate the amount of vibration allowed to the lever *l*. This I do by extending the tail end of the lever *l* a short distance beyond the standard *m''*, where its vibrations are limited by two springs, *n'*, the top ends of which have a tendency to separate from each other, and which are adjustable by means of screws *n''*. By forcing these springs closer together the vibrations of the lever *l* are limited to a smaller space, and the teeth *k* offer to the motion of the wheel *i* a greater resistance than they do if said springs are allowed to separate farther from each other. By these means the motion of the wheel *i*, and consequently of the type-wheel *B*, can be regulated at pleasure.

The receiving mechanism consists of the two electro-magnets *G*, arranged behind the keyboard and on the table *A*, and provided with an armature, *H*, which is secured to a vibrating lever, *I*, that extends under the type-wheel *B*. This lever has its fulcrum on two points, *o*, in the top of the standard *o'*, and the quantity of its motion is regulated by the two thumb-screws *p p'*. A loop, *q*, on the top of this lever forms the guide for a strip of paper which extends over a serrated roller, *J*, being held down on the surface of the same by a pressing-roller, *K*. Both the rollers *J* and *K* have their bearings in standards *L* behind the key-board, and a ratchet-wheel, *M*, that is secured to the side of the roller *J*, serves to produce the feed-motion necessary to draw the paper along as the printing progresses. An intermittent rotary motion is imparted to this ratchet-wheel by a pawl, *M'*, that is attached to the top end of a vibrating arm, *N*, which is

hinged with its lower end to a plate, *N'*, in such a manner that it is allowed to move in a vertical plane. Said arm connects with the lever *I* by means of two toggle-arms, *O*, and as the lever *I* moves up and down by the action of the electro-magnet and the armature the arm *N* is made to vibrate backward and forward, thereby imparting the required motion to the pawl *M'*. A spring, *r*, keeps the lever *I* in such a position that the armature is separated from the electro-magnet.

A point, *s*, projects from the upper surface of the lever *I*, and from its inner edge, in such a manner that the same, when the armature is attracted by the electro-magnet, forms a stop for the type-wheel by coming in contact with one or the other of the cogs *g g** on its back side. The type-wheel *B*, as it rotates, is brought in contact with the ink-roller *P*, whereby each of the characters on the face of said wheel receives the required supply of ink to leave a mark on the strip of paper whenever the latter by the action of the electro-magnet on the armature is forced up against the face of the type-wheel.

The connection of the instrument with the line or with the general circuit and its operation is as follows: A wire, *8*, extends from the screw-cup *t* to one, say the positive, pole of the battery or to the line, and said screw-cup connects by a wire, *10*, with the bushing *b*, which forms the bearing for the arbor *a* of the type-wheel. Another wire, *11*, leads from the lower end of the screw-cup *t* to a screw, *u*, at the under side of the table *A*. The other or negative pole of the battery connects by a wire, *12*, with the screw-cup *t'*, which is provided with a switch, *Q*, that can be brought in contact with the plate *v* or with either one of the screw-cups *w w'*, as may be desired. The plate *v* connects by a wire, *13*, with the perforated ring *d*, which forms the guides for the pins *e*, and the screw-cups *w w'* connect each with one of the ends, *14*, of the helix of the electro-magnet. The screw-cup *w* connects also by a wire, *15*, with a metallic plate, *w'*, on the back end of the key *E**. If the switch *Q* is turned on the plate *v*, as shown in Fig. 2, and if by depressing one of the keys *E* the corresponding one of the pins *e* is brought in contact with the hook *h* on the cog *g** on the back side of the type-wheel, the circuit is closed and it passes through the wire *8* and *10* to the type-wheel *B*, and from the type-wheel through the cog *g** and hook *h* to the ring *d*, and from this ring through the wires *13* and *12*, back to the line or to the negative pole of the battery. If none of the keys *E* are depressed the type-wheel *B* is allowed to rotate freely under the action of the clock-work *O*, and the circuit between said wheel and the ring *d* is broken. With the switch on the plate *v* the instrument is in the proper position to transmit a message.

For the purpose of receiving a message the switch is turned on the screw-cup *w'*, and the key *E** is depressed, bringing the metal plate

w' in contact with the head of the screw *u* on the under side of the table. The current passes now through the wires 8 and 11 to the key *E**, and from thence, through the wire 15 and screw-cup *w*, to the helix of the electro-magnet, which brings the circuit to the screw-cup *w'* and back through the switch and through the wire 12 to the line, or to the negative pole of the battery. Whenever the circuit on the transmitting-station is closed by depressing one of the keys *E* the armature on the receiving-station is attracted by the electro-magnet, and the stop *s* on the top of the lever *I*, by coming in contact with one of the cogs *g* *g** on the back side of the type-wheel, arrests the same, and the letter opposite to the cog which is in contact with the stop *s* is impressed on the strip of paper.

In order to arrest the type-wheel on the receiving-station at the same letter on which the wheel on the transmitting-station is arrested it is essential that both wheels move with precisely the same speed.

Before the operation of transmitting and receiving messages can be carried on successfully it is necessary to equalize the motion of the two type-wheels by means of the governors *F*, and when this is done the transmitting-instrument is arranged as above described—that is, the switch of the same is brought on the plate *v*, while the switch of the receiving-instrument is brought on the screw-cup *w'*. By the depressing of either one of the keys—for instance, the key *Z* on the receiving-instrument—the type-wheel on this instrument is stopped with the letter *Z* right over the lever *I*, and at the same moment the circuit is closed and the armature on the lever *I* of the receiving-instrument is attracted, whereby the stop *s* causes the type-wheel of this instrument to stop at the same instant with the letter *Z* right over the paper strip on the lever *I*, and this letter is impressed on the strip. By depressing another letter, *W*, on the transmitting-instrument both type-wheels are allowed to rotate until the pin *e*, corresponding to the letter *W*, arrests the type-wheel of the transmitting-instrument with that letter over the lever *I*, and the circuit being closed by this operation the type-wheel on the receiving-instrument is arrested in the same position and the letter *W* is impressed on the strip of paper.

From this description the manner of transmitting and receiving messages will be per-

fectly understood. When the instrument is not to be used the switch *Q* is turned on the screw-cup *w* and the key *E** is depressed, and the current now passes through the wires 8 and 11 to the key *E**, and from thence through the wire 15 and the screw-cup *w* to the switch, and through the wire 12 to the line, or to the negative pole of the battery.

I am aware that a printing-telegraph similar to mine has been proposed by Alfred Vail, in 1837, in which the same type-wheel is employed for receiving and for transmitting a message. In his instrument, however, the type-wheel is moved from letter to letter by the action of a pendulum, and a long time is required to transmit a message. With my apparatus, on the other hand, the type-wheel rotates continually, and without interruption, from one letter to the other, being arrested only by the action of the keys or by the stop on the lever that carries the armature, so that for each letter only one pulsation of the electric current is required; but,

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The employment of one and the same type-wheel, *B*, when the same has a continuous rotary motion, as described, for the purpose of transmitting and receiving messages; but this I only claim when constructed, operated, and operating as herein set forth.
2. The arrangement of the series of cogs *g* *g** on the under side of the type-wheel *B*, in combination with a corresponding series of movable pins *e*, operated by keys *E*, and with a stop, *s*, on the lever *I*, which carries the armature, constructed and operating substantially as and for the purpose specified.
3. Arranging a stationary ring, *d*, forming the guide for a series of pins, *e*, in combination with a hooked cog, *g**, on the under side of the rotary type-wheel *B*, substantially as and for the purpose described.
4. The arrangement of the vibrating lever *l*, with flaring teeth *k*, in combination with the wheel *i*, springs *n'*, and regulating-screws *n''*, constructed and operating substantially as and for the purpose set forth.

EDWIN F. REYNOLDS.

Witnesses:

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JNO. G. WELLS.